Zapping Sweetpotato Weevils

Irradiation has yet another useful application.

In the United States, the sweetpotato is best known as a holiday treat that goes with turkey or ham when families gather for Thanksgiving. What many Americans may not know is that the versatile vegetable is the world's fifth-most-produced food crop, with more than 133 million metric tons harvested worldwide every year. That translates to about 47 pounds for every person on the planet, though we in the United States consume only 4 pounds each, on average.

But the popular sweetpotato is threatened by the sweetpotato weevil, *Cylas formicarius elegantulus*. Although the pest is widely distributed throughout sweetpotato-growing regions of the world, areas that do not have it—such as the southwestern United States, around the Mediterranean, and parts of Latin America and Africa—understandably quarantine against it, to prevent its spread.

The weevils cause serious damage by laying their eggs at the base of plants in the field. The larvae that hatch burrow into the roots, causing them to rot. Among food plants, *C. formicarius* attacks only sweetpotatoes and continues to damage roots after they have been harvested and put in storage.

Gassing with methyl bromide has been the only method to control sweetpotato weevils on market-bound roots, but it usually damages them. Furthermore, methyl bromide is being phased out for most uses because it is thought to damage the stratospheric ozone layer that provides protection from ultraviolet light.

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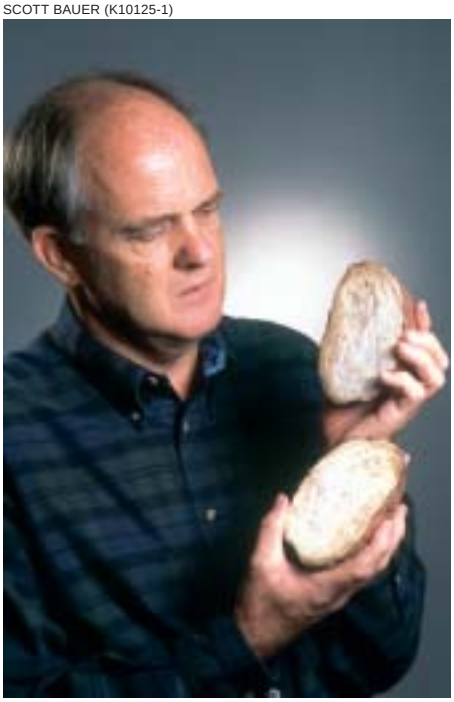

Entomologist Guy Hallman examines white-fleshed sweetpotatoes for reaction to irradiation quarantine treatment against sweetpotato weevil.

From the spring of 1999 to April 2000, Guy Hallman, an entomologist at ARS' Kika de la Garza Subtropical Agricultural Research Center in Weslaco, Texas, studied irradiation as a postharvest treatment to meet quarantine regulations for interstate shipment of roots that can harbor sweetpotato weevils. Exposure sterilizes—but doesn't kill—them. The insects may remain on the roots until they die in a few weeks, but they can't reproduce and they do only negligible damage.

To prevent the spread of weevils, irradiation is being used by growers in southern Florida to treat boniato-type sweetpotatoes shipped out of state. These white-fleshed sweetpotatoes are popular with Caribbean and other immigrants living in the United States and also represent a valuable export.

Hallman previously worked with irradiation to curb fruit flies, but he says that his work on this weevil stands out. "It's the first time irradiation is being used as a quarantine treatment against an adult insect," he says. "That's significant. Because the insects aren't killed, inspectors must have complete confidence in the treatment. Otherwise, finding live adults would be cause for rejecting a shipment."

In 2000, the first year the technique was used to treat boniatos, 175 metric tons were irradiated and shipped. By 2001, the total had grown to 189 metric tons, and it's expected to reach 200 metric tons by the end of 2002. Irradiation has the potential to treat a significant share of the world's sweetpotatoes.—By **Alfredo Flores,** ARS.

This research is part of Crop Protection and Quarantine, an ARS National Program (#304) described on the World Wide Web at www.nps.ars.usda.gov.

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